

What Is Claimed Is:

1. A fuel-injection system for the direct injection of fuel into a combustion chamber (38), through a combustion-chamber top (39) located opposite from a piston (40), comprising a fuel injector (1) having a multitude of spray-discharge orifices (7), a fuel jet (41) being generated by each spray-discharge orifice (7), and a spray cloud (42) being generated in the combustion chamber (38) by the multitude of fuel jets (41), wherein a first opening angle (a1) of the fuel envelope (42) is greater in a first plane (e1) than a second opening angle (a2) in a second plane (e2) extending perpendicular to the first plane (e1).

2. The fuel-injection system as recited in Claim 1, wherein the spray cloud (42) is formed such that a clearance angle (Aw) results between the combustion-chamber top (39) and the fuel envelope (42) which is uniform in the circumferential extension of the spray cloud (42).

3. The fuel-injection system as recited in Claim 1 or 2, wherein the fuel injector (1) injects through a combustion-chamber top (39) that conically widens from the fuel injector (1) in a cross section of the second plane (e2), the combustion-chamber top (39) widening at a greater gradient in a cross section of the first plane (e1).

4. The fuel-injection system as recited in one of the preceding claims, wherein the fuel is injected in the direction of a piston cavity (43).

5. The fuel-injection system as recited in Claim 4, wherein the piston cavity (43) has at least one projection (44).

6. The fuel-injection system as recited in Claim 5, wherein the projection (44) is centrally disposed in the piston cavity (43).

7. The fuel-injection system as recited in one of Claims 4 through 6, wherein the fuel jets (41) injected into the piston cavity (43), when extended along their jet axis (45), have identical spacings with respect to the surface of the piston cavity (43).

8. The fuel-injection system as recited in one of the preceding claims, wherein the inner fuel jets (41) located in the center of the fuel envelope (42) penetrate the combustion chamber (38) to a lesser depth than the outer fuel jets (41).

9. The fuel-injection system as recited in Claim 8, wherein the diameters of the spray-discharge orifices (7) of the inner fuel jets (41) are smaller than the diameters of the outer fuel jets (41), and/or the spray-discharge orifices (7) of the inner fuel jets (41) widen in the discharge-side region, and/or the fuel pressure applied at the spray-discharge orifice (7) of the inner fuel jets (41) is reduced by upstream structural measures.

10. The fuel-injection system as recited in one of the preceding claims, wherein the fuel injector (1) is located in the center of the combustion-chamber top (39) in a centered manner.

11. The fuel-injection system as recited in one of the preceding claims, wherein the fuel injector (1) has 20 to 40 spray-discharge orifices (7).

12. The fuel-injection system as recited in one of the preceding claims,
wherein the spray-discharge orifices (7) in cross section have a spread angle (Sw) of 15° to 25°, in particular 20°, relative to each other.